Stem Cell Therapy in Nonneovascular Age-Related Macular Degeneration.

Journal: Invest Ophthalmol Vis Sci

Publication Year: 2016

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PubMed link: 27116669

Funding Grants: Stem cell based treatment strategy for Age-related Macular Degeneration (AMD), Phase 1 Safety Assessment of CPCB-RPE1, hESC-derived RPE Cell Coated Parylene Membrane Implants, in Patients with Advanced Dry Age Related Macular Degeneration

Public Summary:
This review will focus on summarizing the most promising aspects of stem cell-based therapy for NN-ARMD and highlighting areas that require further research.

Scientific Abstract:
Age-related macular degeneration (ARMD) is the leading cause of blindness in subjects older than 50 years of age in the developed world. There are two types of ARMD, neovascular (NV) and nonneovascular (NN). While anti-VEGF-based therapies have significantly decreased the visual morbidity associated with NV-ARMD, there are no effective treatments for NN-ARMD. A detailed discussion of NV-ARMD and related therapies is the topic of another section of this special supplement. This review will focus mainly on NN-ARMD. Vision loss in nonneovascular ARMD is highly correlated with the loss of RPE cells and areas of geographic atrophy (GA). Pilot studies using subretinal transplantation of autologous or allogeneic RPE during the past 20 to 30 years have demonstrated that stem cell-derived RPE have the potential to rescue photoreceptor function and restore vision. New methods of differentiating RPE from human embryonic stem cells (hESC) and induced pluripotent stem cells (iPSC) have created a potentially unlimited supply of RPE cells to meet the demands of future commercially viable stem cell products. Thanks to fundamental advances in stem cell biology, vitreoretinal surgery, and noninvasive retinal imaging, stem cell-based therapies for NN-ARMD are emerging and several clinical trials are in progress. However, there are major regulatory, safety, and technical challenges that remain. This review will focus on summarizing the most promising aspects of stem cell-based therapy for NN-ARMD and highlighting areas that require further research.